

REMARKS

In the Office Action dated March 17, 2004, claims 1 and 6 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sigwanz et al. in view of Ishige et al.

Applicants note with appreciation the telephone interview courteously afforded the undersigned counsel for the Applicants on June 71, 2004. The Examiner's Supervisor, Mr. Eisen, also participated in this telephone interview.

The above rejections were discussed in the interview. On behalf of the Applicants, counsel proposed making editorial changes in each of independent claims 1 and 6, to avoid the use of the word "optimizing." Also, the Examiner questioned whether the "sequence" set forth in claims 2, 3 and 4 was set forth in the specification. Upon review of the present specification, it is agreed that the precise language in claim 2, 3 and 4 is not present in the original specification, however, those claims were intended to claim the "iterative" procedure that was described in the original specification in the paragraph at the top of page 4. This paragraph now has been amended to transfer the language of claims 2, 3 and 4 into the present specification. Since claims 2, 3 and 4 are a part of the original disclosure, no new matter is added thereby. Typographical errors in claims 3 and 4 also have been corrected.

With regard to the rejection of claims 1 and 6 based on Sigwanz et al., the following arguments in support of patentability were discussed at the interview.

It is an important feature of the method of claim 1 that the setting of the directional characteristic take place using signals that are received by the hearing aid as it is worn by a user. This is because, as explained in the paragraph bridging pages 2 and 3 of the present specification, when the hearing aid is actually being

worn by the user, many different factors come into play, including the unique anatomical features of the user, which cannot be taken into account in a theoretical or purely mathematical calculation and setting of the directional characteristic. Moreover, the directional characteristic in method claim 1 is set in the hearing aid by using the aforementioned signal obtained while the user is wearing the hearing aid, and supplying the signal to a measuring and evaluation unit that is separate from the hearing aid. In this separate unit, filter parameters are calculated using the aforementioned signal, these filter parameters conforming the directional characteristic represented by the received signal to a predetermined, desired directional characteristic. These filter parameters are then transmitted back to the hearing aid and are used to set the filters therein.

By contrast, in the Sigwanz reference, the directional characteristic is set by matching an incoming signal to one of a number of stored, predetermined directional characteristics. Once a best match has been found, the signal processing unit 9 then controls the delay element 3 to set an appropriate delay. There is no calculation of filter characteristics in the Sigwanz reference, and it can be seen that there is no connection between the signal processing unit 9 and the interpolation filters 4a, 4b and 4c in the Sigwanz reference. The signal processing unit 9 in the Sigwanz reference is able to influence only the delay element 3.

As described at numerous locations in the Sigwanz et al reference, but specifically at column 2, lines 46-64, the setting of the directional characteristic takes place by matching the directional characteristic represented by the incoming signal to one of a number of stored directional characteristic patterns. This can take place by a direct matching, or using fuzzy logic, but ultimately a match, or a closest match,

to one of the predetermined stored characteristics must be found and used. Since there is no teaching in the Sigwanz reference that these stored patterns or directional characteristics take into account the particular anatomy or other conditions associated with the hearing aid currently being worn by a user, it is almost certain that the matching will not precisely conform the directional characteristic that is set in the hearing aid to the ideal situation. This deficiency is recognized in the Sigwanz reference, and is addressed by the use of the sigma-delta converters 2a and 2b, which allow conversion of the incoming signals to the precision of one bit, thereby allowing the delay element 3 to be extremely precisely adjusted. Nevertheless, this adjustment still must take place by the aforementioned matching procedure, which inherently limits the ultimate accuracy with which the directional characteristic can be set.

The method of claim 1 avoids this difficulty by undertaking a completely different conceptual approach, namely to set the directional characteristic not by adjusting a delay element, but by calculating filter parameters. Since this calculation is more calculation intensive than merely setting a delay element, it cannot be properly accomplished within the processing capacity that is available in a hearing aid, and therefore it is done in the aforementioned external measuring and evaluation unit.

As stated at column 1, lines 42-47 of the Sigwanz reference, an object of the hearing aid disclosed in that reference is to allow adjustment of the directional characteristic to be achieved with little structural outlay. This is therefore a disincentive for a person of ordinary skill in the art to resort to the use of a separate, external evaluation unit in the context of the Sigwanz system. Moreover, there is no

reason to resort to an external unit in the Sigwanz system, because it has been designed specifically to accomplish all of the necessary calculations within the hearing aid unit itself.

Therefore, even though the Ishige et al reference unquestionably discloses a hearing aid making use of an external unit, a person of ordinary skill in the art has no reason to modify the Sigwanz et al reference to employ such an external unit. There simply is no need to employ an external unit in the context of the calculations undertaken in the Sigwanz et al reference.

The method of claim 1, since it is based on a different setting concept from the setting concept in Sigwanz et al (i.e. calculation of filter parameters as opposed to setting of a delay), makes use of an external unit. Such an external unit is necessary, however, only because of the setting of the directional characteristic in the method of claim 1 proceeds in a completely different manner from that in the Sigwanz et al system.

Moreover, even if an external unit (for reasons unknown to the present Applicants) were used in the context of the Sigwanz et al system, this would merely result in the matching of the directional characteristic patterns taking place in the external unit, instead of in the signal processing unit 9 in the Sigwanz et al system, and still would not result in a system wherein the directional characteristic is set by calculating filter parameters, as set forth in method claim 1.

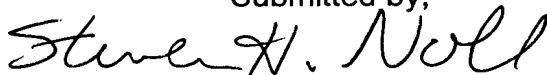
Method claim 1 and claims 2-5 depending therefrom, therefore, would not have been obvious to a person of ordinary skill in the field of hearing aid designed based on the teachings of Sigwanz et al and Ishige et al.

Since the features which support the allowability of method claim 1 involve obtaining signals while the hearing aid is being worn by the hearing aid user, this is not a feature which can be appropriately represented as "structure" in the context of an apparatus claim. Therefore, in the interview it was agreed that if method claim 1 is allowable, dependent claims 7 and 9, which the Examiner has already indicated to contain allowable subject matter, would be rewritten in independent form.

The Examiner did not make a commitment to allowance of independent claim 1 in the interview, but stated she would review claim 1 again with the aforementioned arguments upon the submission of a written response.

In view of the arguments presented at the interview, and the arguments presented herein, all claims of the application are submitted to be in condition for allowance, and early reconsideration of the application is respectfully requested.

Submitted by,



(Reg. 28,982)

SCHIFF, HARDIN LLP
CUSTOMER NO. 26574

Patent Department
6600 Sears Tower
233 South Wacker Drive
Chicago, Illinois 60606
Telephone: 312/258-5790
Attorneys for Applicants.